Examiner Interview Summary

Claims 1, 5, 7 and 14 were discussed during Examiner Telephone Interview with Examiner Jason Proctor on April 11, 2007. The cited references US Patent No. 5,903,718 (hereinafter Marik) and US Patent No. 6,366,878 (hereinafter Grunert) were discussed. In accordance with the discussion, Applicants have amended independent Claims 1, 7 and 14 to further clarify and distinguish over the cited combination.

Claim Rejections - 35 U.S.C. §112

Claims 21-23 are rejected, under 35 U.S.C. §112, as being allegedly indefinite for failing to particularly point out and distinctly claim the subject matter of this invention. The Applicants respectfully disagree. However, in the interest of expediting prosecution, Applicants have amended the Claims 21-23 to overcome this rejection. As such, withdrawal of the rejection is earnestly solicited.

Claim Rejections - 35 U.S.C. §103

Claims 1-14 and 17-20 are rejected, under 35 U.S.C. §103, as being allegedly obvious over Marik in view of Grunert. Applicants respectfully traverse in view of the following.

Independent Claim 1 recites a breakpoint lookup table, wherein the breakpoint lookup table comprises a plurality of break bits associated with a

sequence of instruction addresses, and wherein each of the sequence of instruction addresses has a corresponding break bit, as claimed.

In contrast, Marik discloses that the interrupt from the target system code to the interrupt handler debug routine is called "debugpoint" and that a table contains a record for each specified debugpoint in the target system (see Marik, col. 6, lines 51-55). Accordingly, Marik discloses that the table only contains the record of the debugpoint where interrupt is to occur. Therefore, portions of the target system code where debugpoint are not to occur are not included in the table. Accordingly, as acknowledged by the Examiner during the Examiner Interview on April 11, 2007, Marik fails to explicitly disclose the breakpoint lookup table comprising a plurality of break bits associated with a sequence of instruction addresses, and wherein each of the sequence of instruction addresses has a corresponding break bit, as claimed.

Moreover, as presented in Applicants' previous response filed on November 22, 2006, Marik teaches away from using in-circuit emulator technology, thereby fails to teach or suggest the in-circuit emulation system, as claimed. Marik discloses that "what is needed is a debugging method and system that performs the emulator debugging functions on an off-the-shelf microcontroller in place in the system under test without the need for in-circuit emulator technology" (see Marik, col. 2, lines 13-17). Additionally, Marik

discloses a method and system using a microcontroller for self-debugging (see Marik, col. 2, lines 24-25).

Applicants wish to respectfully remind the Examiner that the prior art <u>must be</u> considered in its entirety, including disclosures that teach away from the claims (see MPEP §2141.02; *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)). Moreover, in response to Applicants' argument, the rejection asserts that "the object of Marik's invention is to <u>enhance</u> in-circuit emulation by using fewer components." Applicants respectfully disagree and respectfully submit that the rejection's interpretation of Marik is explicitly <u>contradicting</u> the reference's teaching and disclosure which is to perform the emulator debugging functions <u>without the need for in-circuit emulator technology</u>.

The rejection admits that Marik fails to disclose a virtual microcontroller operating in lock-step synchronization with the microcontroller by virtue of their identical operation, as claimed. The rejection relies on Grunert to remedy Marik's failure. The Applicants respectfully traverse in view of the following.

The motivation of Grunert is a circuit arrangement for <u>in-circuit emulation</u> of a microcontroller (see Grunert, Title) to reduce the outlay for providing a microcontroller suitable for in-circuit emulation (see Grunert, col. 1, lines 35-36). Accordingly, even through the purpose of Grunert is to reduce the outlay for in-circuit emulation, it still requires in-circuit emulation. In contrast, as discussed

above, Marik's motivation is to <u>eliminate</u> the in-circuit emulation technology altogether. In other words, the motivation behind Grunert is to use in-circuit emulation but with reduced outlay whereas the motivation for Marik as discussed above is to eliminate in-circuit emulator technology completely. As a result, one would not be motivated to combine the teachings of Marik with the teachings of Grunert.

Accordingly, Marik alone or in combination with Grunert fails to teach or suggest the recited limitations of independent Claim 1 and, in fact, <u>teaches away</u> from the recited limitations. As such, independent Claim 1 is not rendered obvious, under 35 U.S.C. §103, over the cited combination. Independent Claims 7 and 14 recite limitations similar to that of independent Claim 1 and are ptentable, under 35 U.S.C. §103, over the cited combination for the same reasons that independent Claim 1 is patentable. Dependent claims are patentable by virtue of their dependency.

As per Claim 3, the rejection relies on Marik disclosing that the debugger routine compares the program counter upon entry into the "INT0 reentrant" routine with the program counter field of each record in the DPT until a match is found, wherein the DPT record is replaced by the new matched record (see Marik, col. 14, lines 59-65). Accordingly, the program counter according to Marik is only used at the debugpoint where interrupt is to occur. As discussed, above and as acknowledged by the Examiner during the Examiner Interview on April 11, 2007, Marik fails to explicitly teach that each of the sequence of instruction

addresses has a corresponding break bit, as claimed. Therefore, the program

counter of Marik is not used for situations where interrupt is not to occur,

whereas Claim 3 recites a program counter that increments through the

breakpoint lookup table as a sequence of instructions is executed, as claimed

regardless of whether a break is to occur or not. Moreover, Claim 10 recites

limitations similar to that of Claim 3 and is patentable under similar rationale.

As per Claim 5, the rejection relies on Grunert disclosing ports P5' and P6'

where the result can be used for inputting and outputting further internal signals

and states (e.g., control signals) (see Grunert, col. 5, lines 10-25). Moreover, the

rejection relies on Grunert disclosing ports P3 and P4' where the internal states

of the master and the slave can be transmitted (see Grunert, col. 5, lines 10-25).

However, ports P5', P6', P3 and P4' are dedicated ports and are separate from

one another. As a result, there is no two phase cycle, a control phase and a data

transfer phase, as claimed, because the master and the slave have dedicated

ports that can communicate and transfer data simultaneously, thereby

eliminating the need for having any two phase cycle. Claims 12 and 20 recite

limitations similar to that of Claim 5 and are patentable under similar rationale.

As per Claim 21, the rejection asserts that Grunert discloses that the in-

circuit emulation comprises two identical microcontrollers (see Grunert, col. 1,

lines 48-51). Applicants do not understand identical structures to either teach or

suggest that the content of the microcontroller can be accessed to reduce

debugging related functions on the microcontroller, as claimed. Claims 22 and 23

recite limitations similar to that of Claim 21 and are patentable under similar rationale.

As such, allowance of Claims 1-14 and 17-23 is earnestly solicited.

For the above reasons, the Applicants request reconsideration and withdrawal of the rejections under 35 U.S.C. §112 and 35 U.S.C. §103.

CONCLUSION

In light of the above listed remarks, reconsideration of the rejected Claims is requested. Based on the arguments presented above, it is respectfully submitted that Claims 1-14 and 17-23 overcome the rejections of record and, therefore, allowance of Claims 1-14 and 17-23 is earnestly solicited.

Please charge any additional fees or apply any credits to our PTO deposit account number: 50-4160.

Respectfully submitted,
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